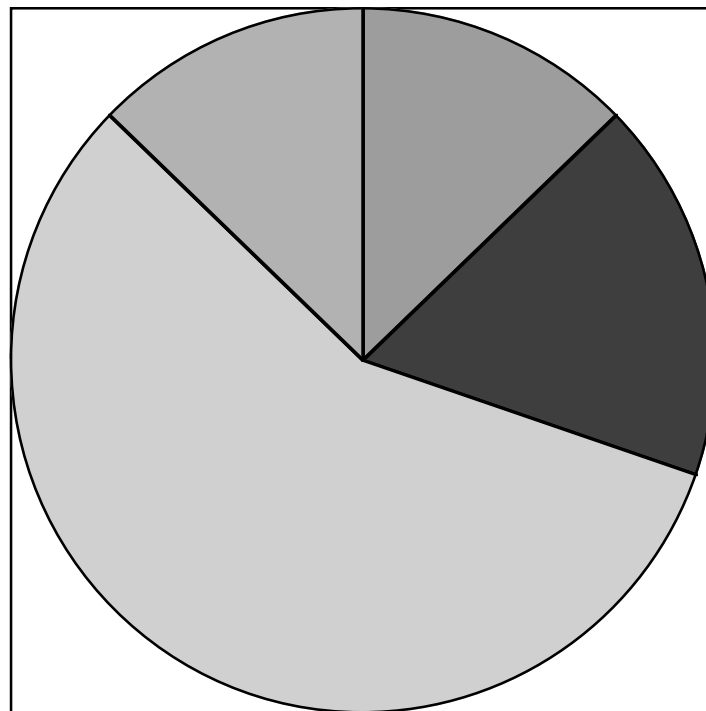


# SAMPLE

- Participants were subjects in the Seattle Longitudinal Study (SLS). These are community-dwelling adults from diverse occupational, educational, and economic backgrounds.
- The subsample for this study consists of those individuals who were tested in 1977 and who returned for assessment in 1984 and 1991.
- The final sample consisted of 588 participants (264 men and 324 women) with a mean age in 1977 of 51.06 years (SD=12.09; range: 22-79).
- The sample was divided into three age categories:
  - **young** (n=121, M=33.23, SD=4.66, range= 20-39 years);
  - **middle-aged** (n=308, M=50.61, SD= 5.34, range= 40-59 years);
  - **older adults** (n= 159, M= 65.49, SD= 4.20).

# Standardized Means for PMA's in 1991 by Age and Congruence Type



- Inductive Reasoning
- Spatial Orientation
- VerbalMeaning
- Word Fluency
- Number Skills
- Slice 6

## MEASURES

*PMA Tests (Thurstone & Thurstone, 1949):*

Inductive Reasoning (R)

Spatial Orientation (S)

Verbal Meaning (V)

Word Fluency (W)

Number Skills (N)

*PMA Retrospective Questionnaire (PMARQ)*

The PMARQ measures individual's perception of cognitive change. Participants rate their current performance relative to their performance seven years prior. This assessment is made for each of the five PMA's. Participants choose from one of the five following choices: (1) much better today, (2) better today, (3) about the same, (4) worse today, or (5) much worse today.

### *Test of Behavioral Rigidity (TBR)*

- Yields factor scores for the three latent variables for rigidity-flexibility: Psychomotor Speed (PS), Motor-Cognitive Flexibility (MCF), and Attitudinal Flexibility (AF).

### *Life Complexity Inventory (LCI; Gribbin, Schaie, & Parham, 1980)*

- Consists of demographic, activity, work, continuing education pursuits, and living arrangement questions. This is a mail survey that participants complete in their home. This research uses the LCI for age and gender variables.

## Procedure

- After completing the PMA tests, participants answered the PMARQ.

### *Creation of Perceiver Types*

- Participants compared their current PMA performance to their prior PMA performance. The data were collapsed into a 3-point scale of three perceiver types: **better**, **same**, and **worse**.

### *Creation of congruence types (see Table 1)*

- Participants were also classified according to change in actual PMA performance between the three test occasions (1977-1984 and 1984-1991)s.
- The classification criteria for positive or negative change was defined as at least 1 SEM above or below their last prior performance. Participants were then classified as having improved, remained stable, or declined in actual performance.
- Cross-tabulations between actual and perceived performance change were computed next. The participants were categorized into one of three congruence types for each ability (see Table 1).

## Distribution of Congruence Types

- The proportion of **Pessimists** ranged from 4.8% for Verbal Meaning to 67.4% for Inductive Reasoning
- The proportion of **Optimists** ranged from 9.8% for Inductive Reasoning to 36.0% for Verbal Meaning
- The proportion of **Realists** ranged from 22.7% for Inductive Reasoning to 59.2% for Verbal Meaning.

Figure 1  
Proportion of Congruence Types by Ability,  
Age, and Gender

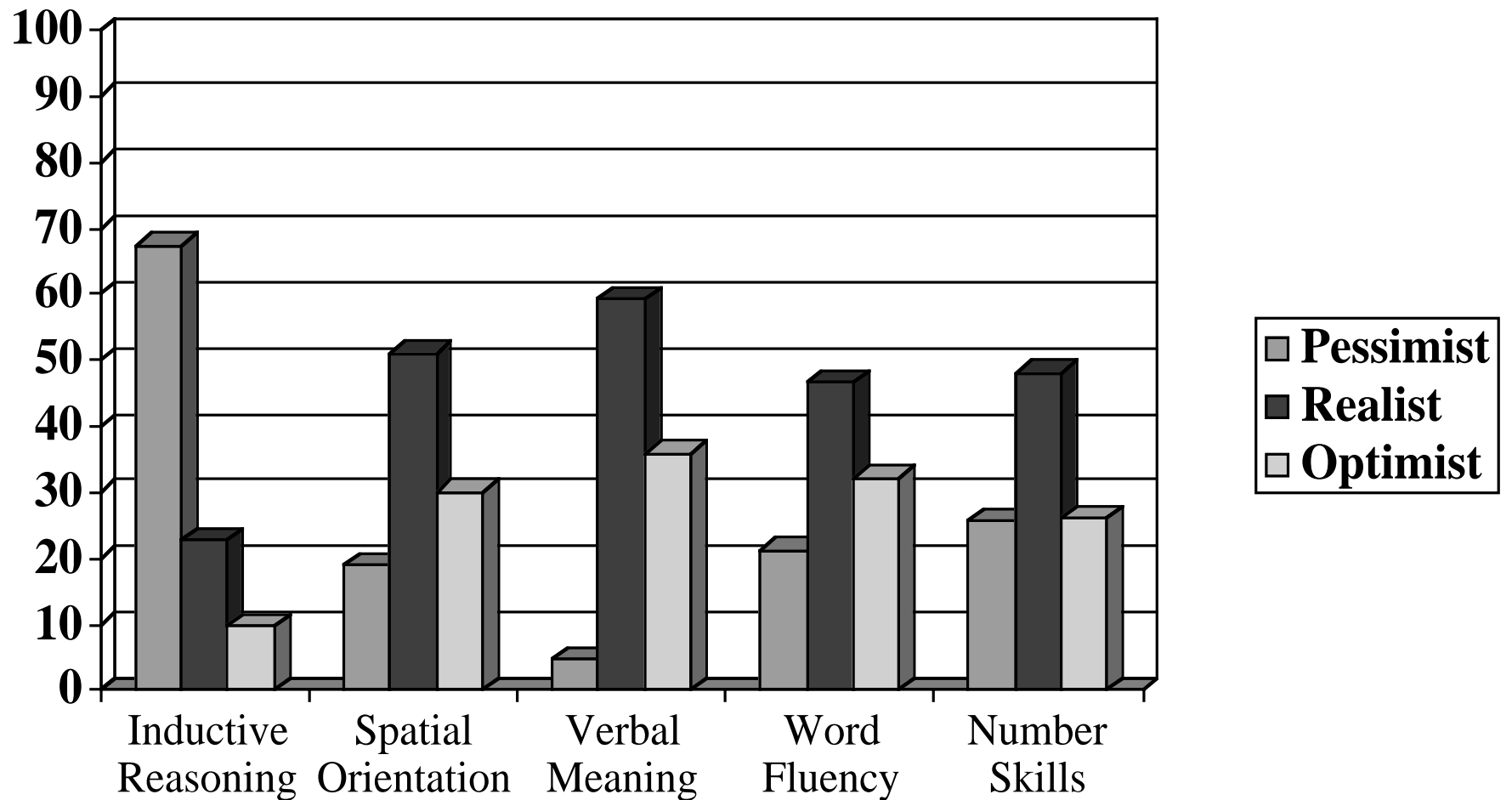


Table 2

Analysis of Variance for Ability Level in 1991 by  
1977/1984 Congruence Type, Age Group, and Gender

Source	df	Inductive Reasoning	Spatial Orientation	Verbal Meaning	Number Skills	Word Fluency
77/84 Congruence Type	2	15.35***	0.04	8.79***	3.73*	3.44*
Age	2	41.26***	60.27***	36.97***	14.25***	17.86***
Gender	1	0.21	29.41***	3.16	1.73	5.53*
77/84 Congruence Type X Age	4	1.48	0.74	3.05*	1.54	3.08*
77/84 Congruence Type X Gender	2	0.81	0.44	1.25	2.17	0.18
Age X Gender	2	0.03	2.47	2.66	1.96	2.44
77/84 Congruence Type X Age X Gender	4	0.58	0.82	2.53	1.15	0.87

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$



Table 3

Analysis of Variance for Change in Ability from 1984 to 1991 by 1977/1984 Congruence Type, Age Group, and Gender

Source	df	Inductive Reasoning	Spatial Orientation	Verbal Meaning	Number Skills	Word Fluency
77/84 Congruence Type	2	11.24***	0.05	14.77***	1.82	3.84*
Age	2	7.40***	7.25***	7.58***	19.60***	4.23*
Gender	1	0.89	0.02	0.66	4.59*	2.15
77/84 Congruence Type X Age	4	0.88	0.69	0.46	2.81*	0.25
77/84 Congruence Type X Gender	2	0.20	0.21	0.01	2.96	1.21
Age X Gender	2	5.08	4.31*	0.30	0.05	1.36
77/84 Congruence Type X Age X Gender	4	1.94	1.51	0.01	1.35	0.65

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

Table 1. Schema for Classification Into  
Congruence Types

Actual Change	Perceived Change		
	Better	Same	Worse
Improved	R	P	P
Same	O	R	P
Declined	O	O	R

Key:

- **Pessimists (P)** – underestimators of positive change
- **Optimists (O)** – overestimators of positive change
- **Realists (R)** – accurate estimators of change

## 1991 Ability Level: Congruence Type Main Effects (Table 2)

- . A 3 (1977/1984 Congruence Type) X 3 (Age Group) X 2 (Gender) ANOVA was conducted separately for each ability. Significant congruence type differences were found for inductive reasoning [ $F(2,588)=15.35, p< .001$ ], verbal meaning [ $F(2, 588)=8.79, p<.001$ ], number skills [ $F(2, 588)= 3.73, p< .05$ ], and word fluency [ $F(2, 588)= 3.44, p< .05$ ].
  - For inductive reasoning, pessimists performed significantly better than realists and optimists ( $p< .001$ ).
  - For verbal meaning, realists and optimists performed significantly better than pessimists.
  - For number skills and word fluency, optimists performed significantly better than realists( $p< .05$ ).

## 1991 Ability Level: Age Main Effects (Table 2)

- Significant age main effects occurred for all abilities.
  - For inductive reasoning, spatial orientation, and word fluency, young adults performed significantly better than middle-aged and older adults ( $p < .001$ , and middle-aged adults performed significantly better than older adults performed ( $p < .001$ ).
  - For verbal meaning and number skills, young and middle-aged adults performed significantly better than older adults ( $p < .001$ ).

1991 Ability Level: Congruence Type X Age  
(Table 2)

- Verbal meaning [ $F(2, 588) = 3.05; p < .05$ ]
  - Young realists and optimists performed significantly better than old pessimists, realists and optimists. Middle-aged pessimists performed significantly better than old pessimists and middle-aged realists and optimists performed significantly better than old pessimists, optimists, and realists ( $p < .001$  for all comparisons). In addition, old pessimists performed significantly worse than old realists ( $p < .01$ ) and optimists ( $p < .05$ ) performed.

## 1991 Ability Level: Congruence Type X Age and Gender Main Effects (Table 2)

- Word fluency [ $F(2, 588) = 3.08; p < .05$ ].
  - Young pessimists and realists performed significantly better than old realists ( $p < .001$ ), and young optimists performed significantly better than old realists and optimists ( $p < .01$ ). Additionally, middle-aged realists and optimists performed significantly better than old realists ( $p < .001$ ).
- Gender main effects favored men ( $p < .001$ ) for spatial orientation [ $F(2, 588) = 29.41; p < .001$ ] and women ( $p < .01$ ) for word fluency [ $F(2, 588) = 5.53; p < .05$ ]. There were no significant interactions involving congruence type and gender.

## 1984-1991 Ability Change: Congruence Type Main Effects (Table 3)

- A 3 (Congruence Type) X 3 (Age Category) X 2 (Gender) ANOVA was conducted separately for each ability. Significant congruence type differences were found for inductive reasoning [ $F(2, 588) = 11.24; p < .001$ ], verbal meaning [ $F(2, 588) = 14.77; p < .001$ ], and word fluency [ $F(2, 588) = 3.84; p < .05$ ].
  - For inductive reasoning and verbal meaning, optimists improved significantly more than pessimists and realists, who actually declined ( $p < .001$ ).
  - For word fluency, optimists declined significantly less than pessimists and realists ( $p < .05$ )

## 1984-1991 Ability Change: Age Main Effects (Table 3)

- Significant age main effects occurred for all abilities [(R)  $F(2, 588)= 7.40; p< .001$ ]; [(S)  $F(2, 588)= 7.25; p< .001$ ]; [(V)  $F(2, 588)= 7.58; p< .001$ ]; [(N)  $F(2, 588)= 19.60; p< .001$ ]; [(W)  $F(2, 588)= 4.23; p< .05$ ].
  - For inductive reasoning and spatial orientation, young adults improved significantly more than middle-aged and older adults, who actually declined ( $p< .001$ ).
  - For verbal meaning, young and middle-aged adults improved significantly more than older adults, who actually declined ( $p< .001$ ).
  - For number skills and word fluency, young and middle-aged adults declined significantly less than older adults [ $p< .001$  (N);  $p< .05$  (W)].



## 1984-1991 Ability Change: Congruence Type X Age (Table 3)

- A significant congruence type X age interaction occurred for number skills [ $F(2, 588) = 2.81; p < .05$ ]. For this ability:
  - Young pessimists improved significantly more than old pessimists, who actually declined ( $p < .001$ ).
  - Young realists, young optimists, and middle-aged realists declined significantly less than old pessimists ( $p < .05$ ).
  - Middle-aged pessimists and realists declined significantly less than old pessimists ( $p < .05$ ). Middle-aged pessimists also declined significantly less than old realists ( $p < .05$ ), and middle-aged optimists improved significantly more than old pessimists and realists, who actually declined ( $p < .001$ ).

## 1984-1991 Ability Change: Gender Main Effects and Age X Gender (Table 3)

- Significant gender main effects occurred for number skills [ $F(2, 588) = 4.59$ ;  $p < .05$ ]. For this ability, males declined significantly more than females ( $p < .05$ ).
- A significant age X gender interaction occurred for spatial orientation [ $F(2, 588) = 4.31$ ;  $p < .05$ ]. Young males improved significantly more than middle-aged females ( $p < .05$ ), old males ( $p < .001$ ), and old females ( $p < .05$ ), all of whom declined, whereas young females improved significantly more than old males ( $p < .05$ ).

## Differences Among Congruence Types in Prior Levels of Rigidity/Flexibility

- Discriminant function analyses were performed for ability-specific congruence types. Predictors were Psychomotor Speed, Attitudinal Flexibility, Motor-Cognitive Functioning, Age, and Gender. Groups were pessimists, realists, and optimists for each Primary Mental Ability
- A significant discriminant function analysis was obtained for congruence types on Inductive Reasoning [ $F(10, 1156) = 2.60; p < .01$ ]
- Wilks' Lambda was significant for age category ( $p < .01$ ), suggesting that, of the five predictors, differences in congruence types for this ability are driven solely by age category.

## DISCUSSION

- The relationship between congruence types and cognitive performance varies among cognitive abilities.
- Prior levels of rigidity/flexibility do not contribute to between-differences in congruence types.
- Future research should consider alternative models of the association between rigidity/flexibility; other contextual variables should be explored as well.

## Major questions

- 1a-For each of the five Primary Mental Abilities, does level of the Ability in 1991 vary by Congruence Type for that ability as established in 1977-1984?
- 1b-Does the association between level of ability for each of the five Primary Mental Abilities and Congruence Type vary by age or gender?
- 2a-Does magnitude of change in each of the five Primary Mental Abilities (1984-1991) vary by Congruence Type as established in 1977-1984?
- 2b-Does magnitude of change for each of the five Primary Mental Abilities and Congruence Type vary by age or gender?
- 3 - Do congruence types in 1984-1991 differ by prior levels of rigidity/flexibility as established in 1977?

## Abstract

This study examined perceived and actual change in performance over time on five mental abilities over a 14-year (1977-1991) interval in Seattle Longitudinal Study (SLS) participants ( $n=588$ ). Participants' age ranged from 22 to 79 years of age at time one. For each ability, participants were categorized into three typologies based on the congruence between their actual and perceived change in performance: Pessimists (underestimators of positive change), Optimists (overestimators of positive change), and Realists (accurate estimators of change). Congruence types are examined as an antecedent of cognitive performance for five cognitive abilities - inductive reasoning, spatial orientation, verbal meaning, word fluency, and number skills. Differences in cognitive style among congruence types were also explored.